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CSCI 3104, Algorithms **Profs. Grochow & Layer**
Explain-It-Back 4 **Spring 2019, CU-Boulder**

The ecology department is planning a large-scale fish migration study that involves electronically tagging and releasing millions of fish across North America, waiting six months, then trapping the fish and recording the where they found each fish, according to its tracking number. In previous smaller-scale experiments, the field scientists used a hand-held device that had a sensor for reading the electronic sensor and a small onboard hard drive that used a predefined table for storing the tag ID, timestamp, and current GPS. In this table, every possible tag had a preset row which allowed for very fast (constant-time) insertions and lookups. While the team would like to re-use this hardware, they do not think that there is enough hard drive space to account for a table with millions of rows. Help them figure out another solution that provides fast insertions and lookups without requiring large memory allocations. HINT: an individual scientist will only tag a few thousand fish at a time.

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